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# The Application Of Food Landscape In Johns De La Howe School

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# THE APPLICATION OF FOOD LANDSCAPE IN JOHNS DE LA HOWE SCHOOL

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A Thesis  
Presented to  
the Graduate School of  
Clemson University

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Landscape Architecture  
Landscape Architecture

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by  
Shuowei Qin  
May 2012

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Accepted by:  
Dr. Matthew Powers, Committee Chair  
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## ABSTRACT

Recently, food landscape has been put forward under ecological urbanism. Most of our food in the plate comes from miles away and transporting them consumes large amount non-renewable energy in earth. At the same time, our existing landscape suffers from the land degrading because of old ecological paradigm. Food landscape encourages combining edible plants in our landscape and works under new ecological paradigm which could best address those two main problems. Food landscape is a newly coined word and does not have a specific definition. From intensive literature review, the origin, the rationale, and the benefits of food landscape will be discussed and two bodies of knowledge, new ecological paradigm, edible landscape are introduced to shape and support the idea of food landscape. The research's outcome will be applied in Johns de la Howe School. Because of the context of school, another body of knowledge, therapeutic garden, will also be discussed to better address the research problems. The research aims to reach what kind of principles should be developed to realize food landscape successfully under those three bodies of knowledge. Another research method case study will be used to fully develop the design principles.

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## CHAPTER ONE

### INTRODUCTION

#### Background

The paradigm of ecology has shifted over last quarter years (Mostafavi, 2010). The model of ecology has turned into a more open-ended, flexible, resilient and adaptable one and the idea that we keep the ecosystem in a steady and controlled way has been gradually abandoned for the reason that we have acknowledged that ecosystem is actually dependent on changes and we are part of the ecosystem. More important, we humans shape the ecosystem where we live – sometimes profoundly and irrevocably. However, based on the old paradigm of ecology, our conservation policies have focused more on functions, which are less tangible and visible to people (Farr, 2008). Thus, with growing recognizing of the new ecological paradigm, ecosystem structure or objects of nature that also includes us should be emphasized. That does not mean the function of ecology is not important; that means we need to make the functions visible – let the ecosystem provide food for us.

According to this contemporary thinking, the term ‘productive ecologies’ has come out referring to working landscapes, or cultural - natural ecosystems that provide food, water, clean air, agricultural produce, raw materials for industry and so on (Mostafavi, 2010). Making these functions visible, as opposed to just the objects or structures of nature, we could be more willing to participate in including and protecting the ecosystem.



Down to the landscape design, it is proclaimed that it is a potent and revelatory act to be able to show and design how ecosystems work so that people then appreciate and participate in the unfolding and working of a landscape (Lister, 2011). The example is the increased use of green infrastructure from which people can see the functions of a



Figure 1.1: Urban bioswale, Sherbourne Common, Toronto / Image credit: WATERFRONToronto,

working landscape - whether in green walls that stabilize an embankment, or green roofs that provide food, or bioswales that filter and slow stormwater runoff (see Figure 1). By making these processes visible, we have the potential to make ecology directly relevant to our life. However, ideal green infrastructures that are supporting productive ecologies go a step further: they they require people's participation in the ecological function. For example, many wetland creation and restoration projects rely on community volunteers for planting and maintenance; urban bioswales and green streets rely on stewardship by the community to function properly; and urban agricultural projects engage youth to work with native plants, bees, or chickens, etc.(Lister, 2011).

Proposal of food landscapes has been paid attention as a type of working landscape with interest in local food continues to increase(Lister, 2011). There are many vivid examples such as vernacular community gardens, a designed urban farm and turning city parks into foraging landscapes with fruit and nut trees. They are all illustrations of our landscapes at work, in which

people can, and do participate. Food landscape has been caught especial attention because it not only deals with working landscape but also concerns about the production of sustainable food. Under the basic idea of energy efficiency which is easier for public to understand rather than 'working landscape', writers, politicians, and chefs are advocating a 'delicious revolution', where 'real food', 'slow food,' and 'localism' will reduce our carbon footprint and bring us to third nature(the garden) (Gray, 2001). It is a significant fact that most energy loss occurs during the delivery stages from power plants to distribution systems. The awareness of 'food miles' (how far food has to travel before it lands on the plates) is growing. Such as 'locavores', means people eat food only produced within cycling distance of their home. It has been argued that with increase the production of sustainable food, we humans should go on the way of being carbon negative while advancing public health and the quality of life (Martin, 2001).

The idea of food landscape will be put in practice in Johns de la Howe School. The School is located at the McCormick County, South Carolina, 7.7 miles from town McCormick and 21.8 miles from Greenwood. It is nine miles from northwest of McCormick on Highway 81. The surrounding of the school is a dense woody forest area bounded with creeks in the south so the groceries are delivered from very far away. The site of the school is around the dormitory buildings, beside the original glasshouse and obsolete orchard. The school has a long history of over 200 years and there are still some historical buildings in the school established by the Frenchman Dr. Johns de la Howe (Don, 1999). The school deals with caring for troubled teenagers mainly. Currently, the school has enrolled 60 students and next year it is estimated that the number will be doubled.

In 1784, Dr. John de la Howe, along with a group of French Huguenots, immigrated to America and settled at the site location (Don, 1999). Dr. de la Howe was well educated in his primary vocation, medicine, as well as education and agriculture (Lewis, 1988). In 1797, after De La Howe's death, his will of requesting the establishment of a farm school for children was made public. And the school is the origin of Johns de la Howe school today. De La Howe's provision was to care for and educate poor children (Don, 1999). The children did farm work of corn, oats and potatoes and that is the reason where in the site there is vestige of farmland and the environment is degraded a lot.

Up until the 1890's, the institution developed into more of a home and school. The school itself became oldest manual training school in the United States and the second oldest institute in South Carolina (Lewis, 1988). Through sales and trade of some property, the school now encompasses 1476 acres on Little River and Clarks Hill Reservoir. After that, it became one of the National Register of Historic Places and a Registered Natural Landmark. In 1987, John de la Howe School has developed into a modern facility for children and adolescents (Don, 1999). The school now includes an administration building, a non-denominational chapel, a modern school and activities building, a cafeteria, an infirmary, 12 cottages, staff residences, a swimming pool and a park.

Johns de la Howe School provides the educational environment for children who need to be separated from their home environments. Original willing of De La Howe is to support orphaned children or those whose parents could not afford to give them proper care (Lewis, 1988). Actually, orphans constitute only a small percentage of the school's children today. Most children did come from lower social backgrounds but current enrolled children mainly have

experience of physically or sexually abused. So more or less children not only receive normal education like common school, but also need special care and healing program.

### Problem Statement

With production industry developed, food on our plate comes from miles away and they are grown in monoculture farmland. This causes unsustainable in two ways. First, transporting food need consume great amount of gas that is non-renewable energy. Fossil fuel is a limited energy and becomes rare and rare. If we are more dependent on the food transportation instead of taking food nearby, the final cost our food will be increasing. Secondly, since agriculture industry became mature, same kind of species is grown in large amount occupying the existing natural resource. Study shows that this method of producing food disturbs the ecosystem which has its own way in producing edible plants (Holmgren, 2002). This kind of interference will result the degradation of land and does not help increase the yield of production.

Through the investigation of the site, it has been discovered that the current outdoor space in the school is very nature but some places are barren and vacant so the positive spaces for children's activities are severely lacking. The barren land is exactly the outcome of the uncontrolled farming before. Now the schoolchildren do not taking up cultivating anymore and the original farmland could not go back to natural landscape and degraded as barren (Don, 1999). The situation resulted in that the school is lack of fun spaces for the students to engage and be educated in the outside. In addition, since the school is in a rural area, grocery purchase is not convenient so the food come from miles away.

### Suggest Solution

According to problems, food landscape based on new ecological paradigm could be thought as solution. As a new design strategy, food landscape recommends combining edible plants within our landscape, not only let the environment more sustainable according to the rules and patterns of ecosystem, but also make production of food which reduces the limit of current food production industry. From the aspect of school, food landscape will bring children closer to the rhythms of nature, educate children about food and eating provide high-quality produce, and, not least, offer the pleasure and beauty that are part of growing and eating delicious food (Mills, 2009).

Based on the far distance of food source obtaining of the school, food landscape also will help solve the food freshness problem and further save the energy and money for Johns de la Howe School. In conclusion, food landscape design alternative will be the suitable solution and lead the healthier way of life of the children in school and this research is also for the development of theory of food landscape in the discipline of landscape architecture.

### Research Questions

Research questions help definite the significant problems and organize the whole structure of the research. For food landscape theory, the questions could be raised such as:

- a. What most important theory is food landscape based on?
- b. How could food landscape solve the problems of degrading of current ecosystem?
- c. What makes food landscape different from permaculture, edible landscape and other related terms?

- d. What benefits could food landscape provide?

When realizing food landscape, these questions needed to be considered:

- e. Are there any principles growing food landscape?
- f. What steps should be taken to realize successful food landscape?
- g. What criteria are they for choosing plants in food landscape?

For practice food landscape in Johns de la Howe, questions should be answered:

- h. How could food landscape function also as a healing garden?
- i. Are school students supporting food landscape in their school?
- j. How much labor needed for food landscape every day per students?
- k. What kind of facilities are needed supporting for food landscape in the project?

### Significance

Food landscape was put forward recently by Nina Marie, an associate professor of Urban and Regional Planning at Ryerson University (Marie, 2011). It has been practiced for a very short time but the idea has already been very popular in landscape design. Many projects started to consider this new strategy and let it fit to the real circumstances. However, the theory is very new so it is not well established. Many professional put idea to it, richen it and try to explain it (Lister, 2011). Therefore, this study is trying to organize those most significant and closest ideas that could explain and become the contents of theory of food landscape. The research is not to give the fixed explanation of food landscape, instead, it is to make the contents of it clear and closer to the current understanding and more important, fit to the theory of ecosystem since most theories in landscape architecture could not be apart from the ecology theory. Professor Marie

mentioned ‘new ecological paradigm’ several times. The research will discuss this part in detail and make it visible to the practitioners.

Besides the research’s contribution on design theory, the application of food landscape in school will involve children appreciate and participate in the unfolding and working of a landscape in which they are participants, not merely consumers through enriching their outdoor activities. Food landscapes are also very sustainable in growing in low energy, saving water and promising better nutrition which good for students both physically and mentally.

In addition, students would develop a greater awareness of the subtlety of nature and learn the values of resourcefulness, stewardship and sustainability (Bell, 1992). It may be made to serve as a valuable lesson and used to reinforce the practical instruction in hygiene, voluntary welfare and philanthropy (Burke, 2005). It provided opportunity and practice for responsibility, consideration and courtesy. It opened opportunities for the teaching of knowledge of nature. (Burke, 2005)

## CHAPTER TWO

### LITERATURE REVIEW

#### Chapter Roadmap

In this chapter, three body of knowledge related to food landscape will be introduced and discussed in detail: new paradigm in ecology, edible landscape and therapeutic garden for children. New ecological paradigm is considered main part of food landscape because it is the ecological theory supporting the theory of food landscape. With understanding the new paradigm, more sustainable and more comprehensive model could be built. Furthermore, the

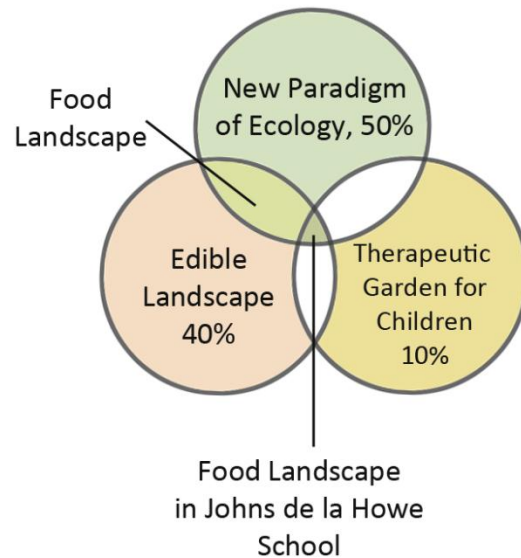


Figure 2.1 Body of Knowledge Structure

knowledge of food landscape itself developed from series of continuous ideas in the time frame which have been studied and practiced for over ten years approximately (Lister, 2011). With edible landscape first came up about one hundred years ago, permaculture then was put forward to optimize the theoretical background around 1970s in Australia and back to United States 'Edible horticulture' movement arose the public awareness of growing food with safety as ornamental garden in 1990s (Holmgren, 2002). Then the new ecological paradigm also includes the permaculture which makes it more systematic. The permaculture will not be discussed in detail in this research because it covers sociological aspect, which is not suitable in this study. Instead, edible landscape is an old branch subject of landscape architecture and discusses many



practical way of planting food. Edible landscape theory enjoys long history; the system of it is already mature, ready to use. While discussing food landscape, edible landscape turns essential and it can give instructive theory for establishing food landscape theory.

Moreover, the research also includes the therapeutic landscape as target discussion. As mentioned in the school background, the enrolled children in Johns de la Howe School are from special family thus suffering from emotional hurt. If the landscape design not only turns working ecology, but also functions as healing space to be beneficial to children's heart, it makes food landscape more practical instead just being dead theory.

### Body of Knowledge I: New Ecological Paradigm

#### **Theory Background**

In the 1970s, The New Ecological Paradigm (NEP) conception came out and critiqued existing paradigm of ecology - Human Exemptionalism Paradigm (HEP). The original paradigm claims human-environmental relationships were unimportant sociologically because humans are 'exempt' from environmental forces via cultural change (Colinvaux, 1973). This viewpoint was shaped by the leading Western worldview of the time and the desire for Sociology to establish itself as an independent discipline. In this HEP view, human dominance was justified by the uniqueness of culture so human has the power to decide and control the environment. Based on this view, we human beings regard the ecosystem is a closed one, if without disturbance by humans, it will always keep balanced and function only at energy level (Forman, 1986). If humans take control of the ecosystem, the natural course turns discontinuous. Sociological scholars like Riley Dunlap and William R. Catton, Jr. began recognizing the limits of what

would be termed the Human Exemptionalism Paradigm. They suggested a new perspective that considered environmental variables. Humans are not dominants or out standers of the ecosystem;

Original Paradigm in Ecology - 'The Balance of Nature'	New Paradigm in Ecology - 'The flow of Life'
<ul style="list-style-type: none"> <li>• Ecosystems are closed</li> <li>• Ecosystems tend to equilibrium</li> <li>• Ecosystems function by relations among organisms and local resources and conditions</li> <li>• Natural and human disturbances disrupt the natural course of events</li> </ul>	<ul style="list-style-type: none"> <li>• Ecosystems are open</li> <li>• Ecosystems are rarely in equilibrium</li> <li>• Ecosystems function by relationships among organisms, resources and landscapes at various scales</li> <li>• Ecosystems are subject to natural and human disturbances</li> </ul>

Table 2.1 The comparison between old ecological paradigm and new ecological paradigm

instead, they are part of the system (Dunlap, et al, 2002). In this way, the ecosystem is open to all creatures and subject to change all the time. In other words, we perceive the ecosystem is not another independent object we need to conquer; instead, it includes us as part of it. Under this theory, humans are ecologically interdependent as with other species. Humans are impacted by the cause, effect, and feedback loops of the ecosystems. Also, the biophysical environment can impose constraints on human's activity (Forman, 1986).

### **Problems under original paradigm in ecology (HEP)**

Ecological succession happens in our natural forest. Ecosystems undergo orderly progression which leads to the development and mature of the ecosystem. During this progress, every species adapt themselves better and better to its ecological community and the relationships between every species formed a mutual beneficial one (Colinvaux, 1973). According to the old paradigm in ecology, because of cultural aspect, we think humans could take full control of the succession so for years we totally have neglected this natural pattern and have simplified the relationships among the natural elements. We simply thought that if we provide the nutrients the plants need to grow and kill the pests and weeds for them we will get what we human beings need from the plants – fruit. However, in fact, mowing, weeding, plowing, and spraying actually substitute the developing pattern of ecosystem (Harker et al., 1999). It causes disturbing the cooperation between the organisms of the ecosystem (Jacke, 2005). Those inputs of seed, fertilizer, energy and equipment all come from distant parts of the planet and leave the bare soil in the farm fields. The ecosystem itself has the ability of self-renewing because of the succession; the disturbance instead holds back it and makes the ecosystem more dependent on human labor thus it becomes weaker and weaker.

Today, human-created landscape dominates large areas of the landscape under our industrialized world resulting from our misunderstanding of our ecological paradigm (Flannery, 2001). Most of our landscape turns into unhealthy suburban ecosystems. Those ‘unhealthy’ reflect at that the ecosystem lost topsoil, lost genetic diversity in seed crops, the water resources are depleted, water, soils, food, and wildlife suffer from chemical contamination, pests and weeds become pesticide-resistant and food production ask for more and more energy input

(Jacke, 2005). Even in these days of even relatively strong environmental concern, we still create the landscapes neglecting those problems left the whole environment in the danger of unsustainability. We also would like to design the environment in a monoculture way that also violates the rule of nature (Harker et al., 1999). It turns out that our gardens tend to be similar in species composition, the plants of public parks have in the well-kept lawns, and landscapes are mostly genetically identical hybrids and cultivars, many sterile and not self-producing (Beatley, 2000). Disconnection happens everywhere. What now we are doing is that when we find the landscape is less productive, we put more energy into growing food and keep doing mowing, weeding, plowing, and spraying which cause the environment dependent on the disturbance more. The cycle finally results in the degrading of our environment and waste limited energy on earth (Lister, 2011).

### **General Concepts about Food Landscape under new paradigms in Ecology**

The most important characteristic of food landscape is that it is often composed of a perennial polyculture of multipurpose plants. Polyculture means many species grow together. The natural perennial polycultures once found throughout the world's humid climates (Barlow, 2000). Different from monoculture, each plant contributes to the success of the whole by fulfilling many functions (Polis, 2004). Thus, food landscape under new paradigms in ecology could also be described as edible forest garden for the reason that it mimics the natural forest ecosystem. Therefore, the food landscape under this framework is an edible ecosystem, a consciously designed community of mutually beneficial plants and animals intended for human

food production (Jacke, 2005). The seven Fs apply here: food, fuel, fiber, fodder, fertilizer, and ‘farmaceuticals’, as well as fun (Lister, 2011).

Food landscape will not be based on the old ecological paradigm any more. We regarded landscape is a dynamic, fluid, and changing, influenced heavily by human actions but not could be controlled by us. The humans and the landscape are coevolving, mutually supporting participants in each other’s lives (McDonnell, 1993). More detail ideas under this paradigm is: firstly, every organism of the food landscape is intimately and irrevocably connect to every other and to the nonliving elements of the environment. Species among them interrelate in varied ways, with varying degrees of intimacy and interaction (Gosz, 1978). Secondly, the structure of the food landscape gives the whole system resilience and adjustability. The structure both causes and results from the system works (Gosz, 1978). However, many ecosystem structures remain invisible because they arise from the relationships between species, and between species and their environment. Last but not least, the ecosystems of food landscape change discontinuously and are complex beyond our understanding (Botkin, 1993). The number of relationships among ecosystem elements is staggering and beyond our capacities to give precise predict. Thus we cannot understand ecosystems simply by breaking things down into their constituent parts and analyze how they work. In a word, we need to take nature’s lead (McDonnell, 1993, Botkin, 1993).

According to the ideas above, new ecological paradigm does not recommend taking control of the ecosystem anymore; we design the landscape in the way that we respect the succession of the ecosystem. If we start to stop tilling and weeding the landscape, the succession will first turn out that annual and perennial weeds colonize the bare soil (Jacke, 2005). Then

shrubs would soon shade out the weeds. After that, sun-loving pioneer trees would move in and a landscape under full succession progress would be born. Eventually, even these pioneers would succumb to longer-lived, more shade-tolerant species. It can take many decades for this process (Martin, 2001).

Under the new paradigm, food landscape is capable of self-renewing, self-fertilizing and self-maintenance. For a self-renewing garden, plant mainly perennials and self-sowing annuals. It allows a healthy soil community to develop by mulching and leaving the soil undisturbed (Martin, 2001). Without disturbing and respect the succession, soil fertility is built with plant that fix nitrogen, amass soil minerals, act as mulch sources, or a blend of these. The pest control work could be reduced or eliminated by providing food and shelter for insectivorous birds and predatory and parasitic insects. Fragrant plants, such as onions, may confuse insects' pests and slow their march toward crops (Jeavons, 1995). Pest and disease problems could also be reduced by mixing species up, rather than planting in blocks of the same species. In a word, the NEP provide growing garden being an art and science of putting plants together in woodland like patterns that forge mutually beneficial relationships, creating a garden ecosystem that is more than the sum of its parts.

### **Benefits of food landscape under new paradigm of ecology**

Because NEP framework let the food landscape almost manage itself, so the most significant benefits of it is that the work of sustaining ourselves to mulching, pruning, occasional weeding, and minimal pest and disease management will be reduced. In this way, a stable, resilient garden ecosystem could be achieved, driven by solar energy.

Other benefits include:

- 1) Provide an abundant diversity of tasty, nutritious food and other useful products. The yield will be maximized for the energy expended (Jeavons, 1995).
- 2) Reflect beauty, elegance, and spirit in the landscape.
- 3) It improves the economic sustainability. Growing your own food reduces the expense of buying them. The food landscape promises to lower the cost of gardening over the long run, so that the cost of homegrown food should be lower.
- 4) Establish a new paradigm for human participation in the ecology of cultural and natural landscapes.

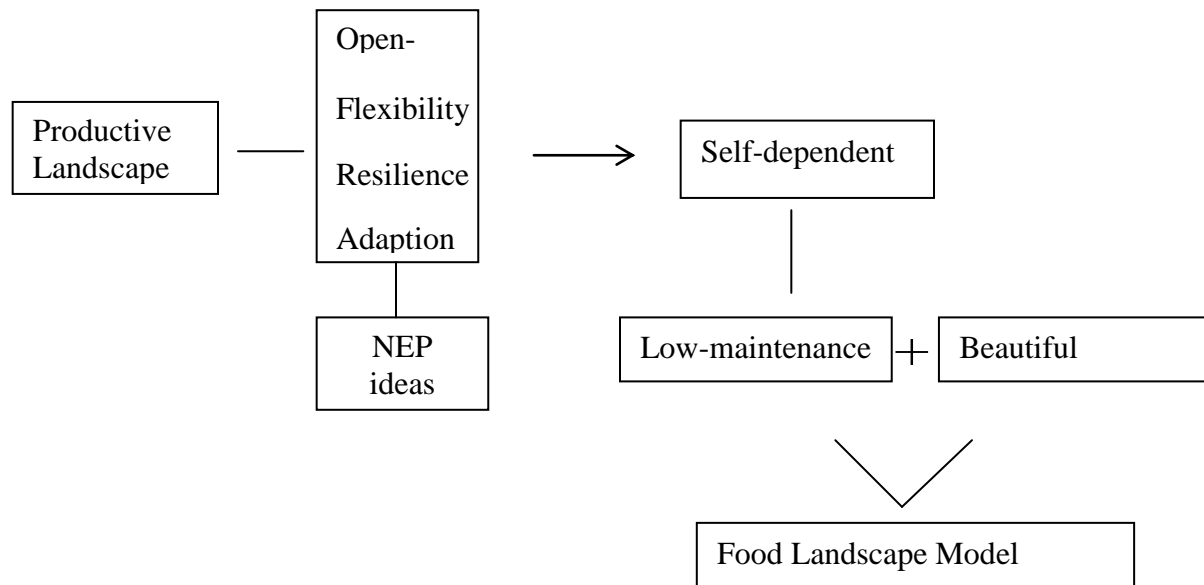


Figure 2.2 Food Landscape Model established from NEP

## Body of Knowledge II – Edible Landscape

As showed in the chart, the body of knowledge of edible landscape contributes most to the application of food landscape. That is to say, although food landscape is a new idea based on the new paradigm in ecology that emerged in past ten years, the application of it still heavily depends on existing experience and systematic knowledge. Edible landscape was applied in very early human civilization and was very popular seventy years ago in United States (Creasy, 1986). However, because of developing technology and massive shift in population from rural to urban, people gradually gave up the edible gardens and instead built up ornamental plants and lawns. Until during last ten years, the warning of energy shortage made people reflect on the importance and necessity of edible landscape and helps it evolve into food landscape (Gillies, 2006).

Edible landscape is not equal to food landscape because it is often used in small scale such as home gardens thus it applies little knowledge of ecology. It consists of knowledge that is more practical: the selection of edible plants, preparing for an edible garden, the ways that make an edible garden both productive and beautiful, the types of edible landscape and maintaining the landscape. Those kinds of knowledge are ones that food landscape need to borrow and combines them to the comprehensive structure of knowledge (Creasy, 1986).

### **The preparing of edible landscape**

#### Analysis of the site and troubleshooting

Firstly, like any other landscape design, you need to get precise site base map to know where the existing structure and plants are (Kourik, 1986). Then it is necessary to conduct a simple analysis including views, wind direction, water drainage, and sun exposure analysis.



Some unusual features should be paid attention such as a stream, marsh or slope, which could add interest to the whole landscape but also pose potential problems (Kourik, 1986). Water problems that water collect and keep the soil too wet are very common. Therefore, if you detect those problems, it is easy to give a simple solution to fix and improve them during design period. Furthermore, adjacent areas also should be taken into consideration because they will cause potential effect on the site. For example, if the site is surrounded by arid grasslands or chaparral, they can become fire hazards and consider planting some fire-retardant plants as a buffer (Creasy, 1986).

After initial analysis, more information should be obtained about the site especially the soil condition that is crucial to edible landscape growing. There are three soil types with different level ability of drainage, fertility and air containing: sandy soils, silt soils and clay soils. Good garden soil contains optimum amounts of all three types of soil particles to ensure water retention and fertility (Siebert, 2004). The addition of large amounts of humus will rectify most soil problems. Nevertheless, despite the structure of the soil, also pay attention to following problems the soil may have which also guides the selection of plants: acidity, alkalinity, salinity, hardpan and nutrient and organic matter deficiencies (Siebert, 2004). During construction period, some necessary additives to the soil will better address those issues. As well as obtaining direct soil condition, existing plants could also give the information whether the soil is healthy and suitable for edible plants (Barash, 2002).

## Programming

After knowing about the site, then go step further to establish the possible functional solutions of the site. The edible gardens could be served as in many ways: a safe play area, a hobby garden or just simply for relax. To make clear what is the future garden's functions and allocate to corresponding amount of space. Most often, the yards need a utility area and should avoid mosquitoes and flies problems (Creasy, 2010).

Then consider the production of the food you need. Many major food plants require good soil, plenty of sun, and considerable attention (Burke, 2005). Some of the less commonly grown food plants – for example, elderberry, pomegranates, figs and many herbs- are more tolerant of soil type and demand less time (Creasy, 2010). So understand the clients' time and effort requirements could adjust the expectation of harvesting. The average manicured home garden usually requires three to four hours a week during the growing season for raking, sweeping, weeding, and trimming (Margaret, 2011). On the other hand, informal and natural gardens can require far less work – for a little pruning, a little trimming, and a little weeding. Nevertheless, note that low-maintenance gardens do not really qualify for the name after the first two years – about the time it takes for plants to become established and ground covers to fill in (Margaret, 2011).

Programming also includes considering the budget. Landscaping can cost anywhere from \$1000 to \$100,000, depending on the area and the elements you use (Mills, 2009). Construction items are more expensive than plants in landscape costs. That means plants represent only 10 percent of the total cost and sidewalks, fences, patios, walls, earthmoving, rocks, extra soil, sprinkler systems – all the expenditures occupies left and add much to the cost (Creasy, 2010).

So using recycled materials as possible and comparing the prices for lumber, plumbing and plants could be potential budget saving choices (Mills, 2009).

Finally yet importantly, work on the legal restrictions. Some laws refer to height restrictions and placement of the structure and notice the property lines. Municipal weed-abatement programs also affect new landscape design; fire departments in particular are interested in eradicating grass weeds in arid-summer areas. Sometimes such programs place constraints on establishing informal meadow or prairie gardens (Wolf, 2009).

### Environmental Planning

Environmental planning includes modifying the microclimate. By modifying the microclimate, thoughtful landscape planning can save 20 to 30 percent a year on heating and even more on air condition (Margaret, 2011). Controlling sun and wind by edible plants are primary aims in climate control. Most regions in United States are located in temperate regions that experience a large temperature range over the year, climate control rarely is a just simple matter of trying to keep cool or stay warm. The object is to plan to serve the dual functions. For example, deciduous trees will realize the idea: in winter, they will block 75 percent of the sun's rays through to heat a south wall, having dropped their leaves. In summer, when the trees have leafed out, not only do they create shade and prevent the house wall from heating, but also evaporation from the leaves actually cools the wall by creating a breeze under the tree. Using annual vines in combination with the trees – say, on an arbor over a patio - is even better than relying on the trees alone, since quick-growing vines such as runner beans or bitter melon will fill in the arbor for the first year or two while waiting for the trees to grow large enough to do the

job (Seewer, 2008). Another tip is to create air pockets to insulate the north wall of the buildings by planting evergreen shrubs close to the wall or evergreen vines that cling to the masonry (Seewer, 2008). Sun never strikes a north wall to heat it. The point of creating air pocket is for insulation to prevent heat loss from the buildings.

Large trees		Medium-size deciduous trees		Small deciduous trees	
Name	Height(unit:ft)	Name	Height(unit:ft)	Name	Height(unit:ft)
Hickory	100	Sweet cherry	35	Apple	30
Pecan	75	Brazilian pepper	40	Apricot	30
Red maple	100	Bradford pear	40	Peach	25
Sugar maple	100	Almond	35	Plum	20
Walnut	80			Russian olive	20

Table 2.2 deciduous Trees to shade south-facing walls

### **Design strategy of edible landscape**

#### **Synergy**

Edible landscape design as one of the landscape design branch follows a lot of common plant design strategies such as repetition, sequence, balance and variations (Hart, 1996). However, most significant edible landscape strategy is called as ‘synergy.’ (Kourik, 2005) With the development of industrialized human settlement, landscape has been broken into pieces: a single row of junipers along the driveway, a vegetable patch here, a few flowers over there, a lone fruit tree neglected in the backyard. However, edible landscape needs to work mimicking

how nature works: as a whole, as a community. The strategy of designing edible landscape should not neglect this idea and should do as much as we can. Thus, edible landscaping should aim to arrange variety of plants and structures into a unified, biologically dynamic whole not pieces cast asunder (Hart, 1996). The synergy edible landscape is interdependent, active and more effective. To the detail, it instructs that when design an edible garden, a landscape should work a variety of characteristics and functions of a landscape: many types of flowers with pollen and nectar can lure beneficial insects which help control pests while others need to be included to attract bees to ensure that the fruits, nuts and vegetables were pollinated (Spencer, 2011; Staples, 2004). It also means that when building multiple micro habitats is possible, also you should choose more species of plants to promise plants diversity (Jacke, 2005).

There is another strategy is to include some structures to accompany plants and add the sense of nature. The low cost, eligible for natural beauty materials such as crushed rock, stone and even ponds not only create more beautiful environment, but also beneficial to plants' growth. (Jacke, 2005) The crushed rock allows rain and irrigation water to percolate into the soil below, where it can be stored for the plants' use. In addition, the rock discourages runoff, reducing erosion. Extensive use of stone helps warm the landscape (Jacke, 2005). The grey flagstones absorb the sun's warmth, yet reflect some sunlight upward to enhance the growth of the vegetables. The heat absorbed by the stones each day radiates into the garden at night.

Besides the two listed above, there are many strategies discussed by practitioners. Mainly the strategies are for plan for the garden, so that the energy will be saved later. Other strategies such as making landscape local, flexible and useful, conforming to aesthetics rules, etc. are also strategies work for edible landscape as well as food landscape.

### Select plants after knowing all related attributes of the plants

There are about over 200 species could be used as edible landscape and their varieties will be much more than that number (Creasy, 2010). The choosing of edible plants need to include many aspects of considerations, not only client's preferences, although it is still very important. The site conditions are the priorities: the zone, the soil condition, sun exposure condition, and the vulnerabilities (Creasy, 2010). The zone means when choosing plant, it should be fit into the zone shows that it could grow naturally there due to the climate condition. Other microclimate conditions also should be considered such as wind, hillsides, proximity of water, humidity, etc. The soil conditions are also very important (Mills, 2009).

Many plants have their soil preferences in soil PH and salinity. The soil conditions of the site need to be determined and analyzed so the select of plant and arranging them will lead to the healthy growth of the plants (Jeavons, 1995). Some plants need full sun to support its growth while others can bear different degree of shade. In making clear of what kind of plants can still grow well in the shade, the space of the site will be effectively taken advantage. It is also avoided that the plants, which need full sun, grow dissatisfactory because of the shade of other plants (Creasy, 2010). Vulnerabilities means the plants will be hard to survive under some harm such as the attack of the pests and birds or disease. Some plants are very strong that they barely have any disease and easy to grow and other needs protection, pesticides and tree care. Besides the physical condition, another attributes which also can be determined is effort scale. The degree of effort involved in growing and using edibles varies widely. The effort scale has been devised to keep from overburdening. It is a simple 1-5 ranking made by Rosalind Creasy (Creasy, 1986).

The ranking assigned to each plant represents the sum of a combination of factors: obtaining the plant; planting, growing, harvesting, and handling it; and processing the product. A ranking of No.1 indicates that the plant requires minimal effort – perhaps as little as picking the

Name	Height	Form	Zone	Effort Scale	Sun Exposure	Bloom	Edible part	Soi l	Vulnera ble	Variety
Blueberry										
Chestnut										
Beans										
Kiwi										
.....										
Prickly										

Table 2.3 Example sheets for studying edible plants

fruit; while a No. 5 was assigned to plants that require both high maintenance and considerable effort to process the product. With all the attributes of plant discussed, we can develop a plant's information list as below: (blue berry as an example)

Blueberry (Rabbiteye blueberry, V. Ashei)

Height: 15 -18'

Form: deciduous shrubs

Zone: 3-9

Effort Scale: 3

Sun exposure: full sun

Bloom time: spring

Edible part: fruit

Soil: acid and moist

Vulnerable to: some diseases, some pests including birds

Varieties suitable for southeast: Southland', 'Tifblue', 'Wolcott'

Thus, while choosing the plant during the literature review period, the table can be established to further determine the select of plant for the design of food landscape in Johns de la Howe.

### **General Design principles for Aesthetic Considerations**

An edible landscape that is well designed is a pleasure to look upon because it is cohesive. It provides a sense of unity that is restful to the eye and to the spirit. It is very important to consider aesthetic when design. The design principles used to achieve unity in landscaping are similar to those used in any form (Wolf, 2009).

Any good design will consider relative scale as one principle that helps to achieve harmony (Hart, 1996). In the garden, the factor of scale is particularly vital because living materials have different growth patterns and can change radically in appearance over the course of time. Scale has to be considered in garden structures, too (Kourik, 1986). In choosing the components of a landscape, another factor to consider is the balance of the various parts. In less formal yards, plants and structures should be arranged to strike an asymmetrical but pleasing visual balance (Creasy, 2010). For example, a large tree might be balanced by a cluster of shrubs or a gazebo. Also simplicity is a very certainly an important factor in designing for unity. A landscape should have an overall framework in which a few plants of similar texture, form,



foliage, and color dominate. Some of the plants forming the framework are used at regular intervals (Burke, 2005, Creasy, 2010). Only a few construction materials should be used, and their textures should be complementary. Brick, gravel, and wood are pleasant together, but the further addition of tile or stucco would result in a jumble. Within the larger framework, certain plants or small structures are made to stand out, and the limited use of such accents is part of other design principles, variety (Vogelzang, 2011). Plants used as accents are known as interest plants, and they usually have some outstanding feature – the graceful, pendulous form of a weeping plum, the brilliant white flower sow of an almond, the flame-colored skin of the persimmon fruit, or the huge leaves of a banana (Vogelzang, 2011).

### Body of Knowledge III: Therapeutic Garden design for children

#### **General Concept of Therapeutic Garden**

Through the information related to Johns de la Howe School, we know that children enrolled there have special family background: they may not be growing up in a healthy environment for their hearts. Thus, at bottom of their hearts, they might have some psychological problems more or less, which hinder their comprehensive growth toward adult. The school already conducted some clinical therapy program indoors, however, if the landscape designed there will consider therapeutic for children, it may be a long-time potential healing environment for them (Day, 2007).

Environment could be created as healing places since humans had begun to build dwellings (Lewis, 1988). Gardens also can be healing and restorative via a number of techniques. The most obvious is the aesthetics of nature that is, creating a beautiful vivid place which

encourage us to go outdoors (Ryder, 2006). Being outdoors means experiencing sunlight, viewing trees and flowers, listening to the sounds of water or birdsong – the combination of these and other elements that make up a garden can have measurable stress-reducing benefits (Casey, 2007). The healing effects of a garden will be more powerful if it is detailed to support other sought-after activities not only including the basics of being in a plant-filled place. It is concluded that the design provide the place that encourage people to socialize, to spend desired time alone, to stroll, to engage in more vigorous exercise, to choose being in the sun or shade, and so on. (Heffernan, 2007)

Therapeutic Garden for children falls in the category of healing gardens. It mainly deals with the designing a healing space for children, facilitating an improvement in the overall sense of children. It should have therapeutic or beneficial effects on the great majority of children and should not produce negative reactions upon them when they travel around the garden (Lewis, 1988). Thus, it is very important that seeking input from children before design the garden (Heffernan, 2007). When knowing plenty about the need of children, the design could let children make playful interactions with each other, natural objects, and materials so the child learns in a special boundless way that stimulates the development of mind, body, and spirit (Lewis, 1988). Healing garden makes children's interactions with the physical environment are intimate and immediate.

Healing gardens have special significance as places where the inner life of the child can be integrated with the external world, where children could have both stimulation and solace (Heffernan, 2007). British child psychiatrist and pediatrician Donald Winnicott (Winnicott, 1971) called this experiential domain the child's 'potential space,' where, through play, children

can make themselves fix internal conflicts, express fears, and communicate desires nonverbally. Winnicott's notion of 'potential space' (resulting from a lifetime working with children and families) broadens the idea of healing garden to playful garden settings which turns more common and feasible (Heffernan, 2007).

### **Development of healing gardens for children**

The field of specialized landscapes designed for children has been evolving for more than fifty years and has much to advancing the healing role of children's gardens. An early pioneer was the British landscape architect Lady Allen of Hurtwood (Day, 2007). She was impressed by the Adventure playgrounds in Copenhagen and led a successful movement to establish similar facilities in London neighborhoods serving families traumatized by the fear of World War II (Day, 2007). In the 1970s, she began the founding of the Handicapped Adventure Playground Association. Allied developments include children's farms, where there is a strong focus on animals. Most children's farms have a strong commitment to inclusion of children of all abilities, including activities such as therapeutic horseback riding.

Healing hardens for children are a very recent development in the medical field. Lindheim et al. (1972) propose design guidelines for children's hospitals and emphasize the importance of children's play, the outdoor environment, and experience of nature – themes reiterated in the design guidelines book by Olds and Daniel (1987). A decade later, in a comprehensive treatment of healthcare facilities for children and families, Shepley (1998) reemphasized the importance of play, calling it a 'healing activity' (p.109), though she notes in her literature review that there is 'no scientific research on children's outdoor health facility play

spaces' (Rivkin, 1995). The significance of the natural environment can also be inferred by Ulrich's research finding in relation to adults and it is assumed that similar positive health correlations apply to children. In the world of practice, landscape architects have begun to have an impact on hospital design. In 1995, it was the cover theme of the January issue of *Landscape Architecture* (Volume 85, Number 1, pp.56-79). Of the six built projects presented, one was specifically designed for children.

The history of the general field of children's environments suggests five basic assumptions about child development, play, and the outdoor environment that can be usefully applied to children's healing gardens:

1. Outdoor play. Outdoor play, in and of itself, is a critical factor in healthy child development.
2. Environmental quality. Through design, the quality of the outdoor play environment can critically affect the range and depth of play activity and the attractiveness of the site to children (Lawless, 1977).
3. Significance of nature to child development through play. Nature can be designed into the environment in such a way that children can have intimate contact with the basic elements of life: sunlight, fresh air, soil, water, plants, and animals (Lawless, 1977)..
4. Trained play leadership. Play leadership and playful staff intervention can extend the range, challenge, and creativity of both indoor and outdoor experience far beyond what might be possible in undirected situations (Moore, 1993).
5. Indoor-outdoor links. The ease with which children can observe nature from inside and/or move easily from indoors to outside significantly affects the positive impact of the natural environment on their quality of life (Lindquist, 1977).

## **Garden therapies**

### **Play Therapy**

In 1956, Ivonny Lindquist started a play therapy program in the University Hospital of Umea. In the foreword to her book, *Therapy Through Play* (Lindquist, 1977), John Lind emphasized that ‘Children need to get out into the open. If they are confined to the ward,’ and he theorized that ‘the longing to get out gradually vanishes. Life outside the window ... is no longer real.’ She tells a story of how much she learned from the positive reactions of one particular boy in response to Lindquist’s bringing in seasonal natural objects (flowers, mosses, mushrooms, and berries) and arranging them into a ‘miniature, enchanted wood.’ (Lindquist, 1977)

In a 1977 monograph produced by the Swedish Department of Social Welfare, reporting on the Karolinska project, the outdoors was presented as important because it is where the child could move, breathe fresh air, feel it on his or her cheeks (Moore, et al, 1997).

The smell of the outdoors is particularly significant because it contrasts so strongly with the alien smell of medical facilities. The aroma of a space wraps around and envelopes a person. It is very subtle, like birdsong or music. Humans have a common positive appreciation of some smells (roses, for example, or lavender). Soothing effects in both body and mind are generated by the biochemical reaction to these pleasurable odors (Lawless, 1997).

### **Horticultural Therapy**

Horticultural therapy has developed extensively in recent years, and covers a wide range of contexts and clients, including children with special needs. Lindquist paved the way for the strong connection that we now see between play therapy and horticultural therapy. There is a

powerful illustration has also been presented by Hoffman and Castro-Blanco. They describe the case of four-year-old Eric, diagnosed as having speech-language impairment, a variety of behavioral problems, and depressed affect. He participated in twice-weekly horticultural sessions for fifteen weeks with a horticultural therapist in the preschool greenhouse. The authors describe in detail how Eric engaged initially in 'free play,' and then gradually 'adopted' the plants, showing concern for them. Through caring for his own garden he was able to verbalize feelings about his troubled family situation (Heffernan, 2007). He often commented that caring for the plants made him 'feel good'. By the end of the program, Eric's in-class behavior had improved markedly. He also exhibited an improved affect and capacity to express empathy and nurturance. The authors concluded that horticultural therapy is especially appropriate for working with young children to help enhance their social skills by providing a neutral or positive milieu for expressing nurturing and prosocial feelings. At the same time, it provides children with an enhanced sense of competence and self-esteem.

### Nature as Therapy

It is generally recognized that many adults view nature as a restorative, therapeutic environment in their everyday lives. Experience of nature is nutrition for the human sensory system – our mechanism for perceiving and understanding the physical world (Rivkin, 1995).

Garden settings are important for children because they live through their senses. As they explore their surroundings through play, they engage in development processes that can be extended, enhanced, and facilitated by adult professionals. This is well understood by progressive educators (Moore and Wong, 1997), who all agree that children's learning must start

with primary experience of the real world. Cognitive development must resonate with real experience; if not, learning becomes an ungrounded abstraction, without meaning to the child.

### **Ideal plants used in Horticultural Therapy**

Different stages in the production of plants provides many diversions; from planting and nurturing, to the process of harvesting them for eating, drying or for their eventual use in crafts and related projects. The cultivation of plants provides an avenue for teaching an appreciation of nature's life cycle. Group activities promote socialization and teach children to work together for a common goal. Planning and organizing a herb or flower garden provides an excellent outlet for creativity and imagination. Digging, pruning and hoeing are excellent opportunities for releasing anxiety and stress in an acceptable manner (Heffernan, 2007). Gardening provides children with an opportunity to build self-esteem through a meaningful, outdoor activity with living material and it stimulates and motivates children to further this interest when they leave the settings.

### **Ideal Herbs in healing garden for children**

Grow herbs in a sunny area that is self-contained, so that they can be easily labeled, maintained and harvested. The species are as followings: 1) Mint: Perennial. No gardener should be without this wonderful plant whose varieties include spearmint, peppermint, grapefruit and other exotic flavors. 2) Sage: Perennial. There are over 500 sage species. The wonderful aroma of sage evokes everything from turkey stuffing to aromatic fixatives in beauty aids. The taste and smell of the leaves are a good way to stimulate the senses of clients suffering from dementia. 3) Parsley: Biennial. Most varieties of parsley are used for garnishing food, in vinegar making, and

for flavoring salads and sauces. 4) Lavender: Perennial. It has a comforting fragrance that is calming. This plant must be well protected from cold in the winter months. 5) Chives: Perennial. The smallest of the onion family. 6) Lemon Balm: Perennial. 7) Basil: Annual. 8) Garlic: Annual. This herb is one of the most popular and widely used plants in the world. 9) Thyme: Perennial.

#### Ideal flowers in healing garden for children

The following plants prefer a sunny area with well-drained soil that is rich in compost or natural fertilizer. Strawflower: This annual grows to approximately three feet, and is the most popular of the everlasting flowers. The daisy-like flowers range in colors from white, pink, yellow, salmon and rose. Flowers should be picked in the bud stage, before they are fully open. A wire should be inserted through the head before drying. 1) Statice: This biennial is grown as an annual, reaches approximately two feet, and its color range includes white, pink, yellow, lavender, blue and rose. It should be harvested when the color is showing along the right side of the flower. 2) Larkspur: This annual grows to approximately two feet and its color range includes white, pink and violet. Larkspur dries beautifully and should be hung to dry in bunches in a cool, dark area. 3) Baby's Breath: A perennial, baby's breath grows to four feet and provides a drift of white when in bloom. The tiny, white flowers give a light, airy effect to most designs and make a great filler. Baby's breath is necessary when creating Victorian or period designs. 4) Pansy: This annual grows approximately 6-9 inches tall. It has beautiful, velvety-looking, multi-colored heads and is familiar to most people. Grow pansies in window boxes and raised containers for easy access and harvesting. Pansies can be used with other flowers in designing shadow boxes,



pictures, sun catchers, stationary and numerous other craft items. 5) Yarrow: Perennial. This plant grows to 4 feet tall. Honesty: Annual. This biennial grows up to 4 feet in height and this unique species is already dry when harvested. 6) Love-in-a-Mist: This annual grows up to two feet in height and its delicate flowers come in a variety of colors such as white, blue, pink and violet. Flower heads can be dried using a flower press, but the main use for this plant is for the seed heads that form in mid to late summer. 7) Hydrangea: Perennial. This shrub grows up to 5 feet and produces pink, blue or white colored, flat or cone-shaped flower heads.

### **Garden Typology**

One of the garden typologies is the formal therapeutic garden. It has accent on explicit, defined, garden-based approach to therapy, most likely targeted toward a specific area of therapeutic need, requiring therefore a custom-designed landscape to accommodate particular therapeutic strategies (Cooper, 1998).

Another typology is informal play and horticultural therapy garden emphasis on active participation by children (and parents) in the gardening process. It accents on diversity and freedom of choice by the individual child to act on the garden environment in many ways. This freedom serves to balance the medical environment over which the child has no control.

The third typology is informal, strolling garden focuses on de-stressing, exploration, restoration, meditation, prayer, and relaxation. It accents on providing a diversity of informal settings for walking, privacy, sitting, socializing, and sensory interest (color, texture, fragrance, butterflies fluttering, birdsong). The landscape features in high quality aesthetic surroundings, including special child-landscape features.

Another kind of healing garden for children is community-based, multiuse, multipurpose garden accents on diverse 'habilitative' program that serves several populations, most likely embracing a range of formal, informal programming approaches, as listed above. Commonly includes joint use of facility by community groups.

### **Design Recommendations for children's healing gardens**

Many designers recommended orienting the garden site to receive year-round sun and shelter from winter winds. Many users refer to healing gardens as 'green oases.' Plants are the most highly valued feature and provide the essence of 'healing'. But children need outdoor spaces warmed by the sun as well as the plants all year round. Site the garden on level terrain. Anything but a very modest degree of topographical variation in the garden site will give difficult if not impossible access problems. Another guideline about site planning is to conserve natural features of the site. Natural features, such as mature trees, rock outcroppings, and watercourses, should be conserved as they provide natural identity to the site and potentially useful amenities (e.g., shade, in the case of trees). Conserve as much as topsoil as possible, to give the new plantings the best possible start in life.

About security aspect, it is suggested that to locate the healing garden so that it is fully enclosed on all four sides and inaccessible from the public surroundings of the facility. Children of the garden must be protected from intrusive, unwanted social interaction (Dannenmaier, 1998).

Therapeutic garden design also needs to consider microclimate. The designers recommended providing shelter from the summer sun. Children have sensitive skin that can easily be damaged by overexposure to the harsh summer sun. Children with limited mobility are

especially vulnerable, as they cannot get away quickly from direct sun. Plenty of shady areas need to be provided. Filtered light works best at many latitudes. Deeply shaded, dark areas are not attractive and because of the low illumination, do not function well as activity settings. At the same, also provide for the penetration of spring, winter, and fall sunlight. Use south-facing orientations for activity areas (Lawless, 1997). At many latitudes, outdoor activity spaces are more attractive and comfortable if direct sunlight is allowed to penetrate. Tree species should be chosen and shade structures designed and positioned in relation activity spaces oriented toward the sun, to allow sunlight to penetrate during temperate and cold seasons. As the tree leaf out, these same spaces will be protected from direct sun during the hot season. These general principles of design for human comfort are supported by many research studies of public use of urban open space (Cooper Marcus and Francis, 1998). Do not forget to provide shelter from precipitation in the design. In the middle part of the year when the weather is warm or hot, children enjoy being outside, even when it is raining, provided that the activity space allow children to continue with their activity and to be exposed to the sensory enjoyment of the elements.

Make all entrances welcoming and child-friendly. Children, especially first-time users, should feel comfortably a home and welcomed into the garden with some friendly gestures. This can be achieved by the placement of artifacts such as sculpture, benches, playful archways, permanent color, or colorful plantings.

In the design, provide a clear hierarchy of pathways. Primary paths should provide for relatively direct travel through the garden – especially for users with sight impairments. Secondary and tertiary pathways can be designed to be progressively more indirect with an

accent on exploration and discovery (Moore et al., 1997). Provide smooth, even surfaces to all primary pathways. Main pathways should be constructed of concrete – a material that can be tinted and inlaid with ceramic tile for aesthetic enhancement.

Many clinical designers also provide a broad range of settings to accommodate children being together as well as children being able to withdraw from the group to be alone. It is fundamental to the role of the outdoor environment that each child has freedom to find her or his own most comfortable and enjoyable setting. Settings where special events/entertainment can be held or staged are also considered (Moore et al., 1997). Consider the possibilities for creating programs of special events and entertainment for children and their families. Many special events are best accommodated by a space that is custom designed for good audience-performer appropriate solution if space is available. Alternatively, an area in the garden can be designed to be converted into a temporary stage and presentation setting.

Whether temporary or permanent, the space should be designed to support theatrical accouterments such as backdrops and wings. Performance areas should be orientated facing the sun for good illumination (Dannenmaier, 1998). The sun should be behind the audience, who should be protected by permanent or temporary shade. Provide a range of physical/social settings so that all individuals can explore and discover their own level of challenge. In order to grow, children need to be challenged.

The design also needs to enhance children-nature relationship (Lindquist, 1977). Many clinical institutes have as many options as possible for children to have primary experience of nature, that is, to interact through their senses and/or through hands - on activities. The essence of a healing garden from perspective of children is for them to experience directly the sensory

richness and living quality of nature. Diversity and change are the key criteria. The natural setting should contain greatest diversity of plants possible, selected for their collective year-round performance from early spring to late fall. At any time of year there should be a new natural event happening in the garden. Select species that produce flowers, fruit, and other parts that can be harvested and used by the children directly as play objects. At the same time, they provide opportunities for plantings. One of the most meaningful activities for a child undergoing mental problems of medical treatment is to be able to intervene in the cycle of life – to start a new life, to plant a seed. So it is with harvesting which let the children understand the natural consequence of planting.

Diversity of plantings is also very important in therapeutic garden. Species should be within the constraints of climate and available space such as water. Water is a traditional garden element. Research shows it is a popular play material and a strongly remembered childhood experience (Moore and Wong, 1997). In healing gardens, water is even more significant as it is the source of life. It is not difficult to imagine including a naturalistic fish pond, perhaps elevated to avoid children falling in. The chosen solution will depend on many factors.

In addition, it is necessary to provide attractive movable items that will engage children in their use of the garden. One of the fundamentals of children's play is the desire to manipulate the environment. Small wagons that can be moved around or a sandbox with toys will be sources of delight for children.

Other general principles for children's garden include: The scale of children needs to be considered. It is important to identify both the common needs of children and adults, and special needs particular to the young. Although adults see the world on a large scale, children are

attentive to details. The child seemed more interested in rocks, twigs, lizards, and other more tactile, small-scale objects he could explore on an intense level. Children are intrigued by the miniscule details that give an object beauty or interest; adults often take the simple and small elements for granted, preferring to see the ‘big picture’ from a more distant standpoint. When designing for children, this is an important fact to remember. Furthermore, it is important to consider design principles alongside safety precautions to create successful children’s space. A design cannot be masterful without meeting the safety needs of children, yet issues of safety and liability cannot overshadow the various desires and needs of the child. The two are not exclusive, and when used successfully in cooperation with one another, provide the best spaces children can have to further their development, happiness, and health (Casey, 2007).

Children must have a retreat just as adults need private spaces in which to relax and escape. One way children retreat is to seek enclosure. Children need places where they feel safe and can think and play privately, away from the constant supervision of adults. This is essential to the development of a sense of autonomy, and gives children a place for creative play. Spaces for enclosure should be situated within a safe environment so adults can remain nearby and assure safety of the child, without invading the private space the child seeks (Dannenmaier, 1998). Woven willow branches can create sculptural spaces for children to hide in or move through, and vines trained over a low, simple arbor can create a private space through a screen of greenery. Creative spaces for enclosure can be very beautiful and fitting to a garden setting that adults use as well.

Selection of plant material requires careful consideration when designing for children. Plants should be hardy, interesting to children, and safe for their environment (Dannenmaier,

1998). Two primary dangers must be considered: plants that are poisonous or have poisonous parts, and plants with hazardous parts, such as thorns, barbs, or sharp blades. Many common plants, or their parts, can be hazardous or fatal to children if consumed (Moore, 1993). Anemone, caladium, foxglove, hydrangea, lantana, mistletoe, and philodendron are poisonous if eaten. The bulbs of amaryllis and daffodil, the leaves of apple and privet trees the seeds of apple and wisteria, and berries of holly and privet are all poisonous (Dannenmaier, 1998). Should these be totally eliminated, or should children be taught to respect dangers? This needs to be considered in the design. Moreover, some plants provide particular attraction and interest to children, often based on bright color, unusual behaviors, fruits, flowers or plant parts that can be used creatively for play, projects, and crafts.

Landscape need to consider the storage problem. For this situation, carefully estimate and fully provide for storage needs outside. Storage is one of the most commonly overlooked needs in the design of spaces for children. Location next to activity areas and size (which should be then multiplied by two, one is tempted to add) should be carefully considered by the Child Life and horticultural staff. The more that items to be used outdoors can be stored outdoors close to their use locations, the more richness and diversity will be added to the program.

Finally yet importantly, it is also recommended matching the level of required garden maintenance to the ability to support the costs by the institution. Whatever type of garden is installed, it will require some level of maintenance. It is reasonable to assume that the institution will commit an appropriate amount of maintenance support; otherwise the idea of implementing a healing garden will not be feasible.

### CHAPTER THREE

#### INTELECTUALL MERITS

Food landscape is just recently initiated to talk about so there are few researches related to this topic in landscape architecture. Or even it can be said that the food landscape has not been academically treated so it was lack of authoritative definition. However, many projects dealing with food landscape have been going on since the beginning of this century and most of all are regarded as sort of ‘edible landscape’. So currently in our profession, there is a big knowledge deficiency of food landscape especially in research manner so that food landscape could not be systematically treated, analyzed and discussed. If food landscape only is mentioned in interview, lecture and talks between professionals, the information will be broken into pieces and this important design methodology will not be applied properly and lack of consistency. Finally it may disappear in the future.

Design is based on research. So this research tries to study food landscape and its application in scientific way and concludes the related knowledge as comprehensive as possible. It tries to find out how food landscape become ‘buzz’ word and its developed way back to edible landscape. It aims to get some related idea into shape so professionals and clients will not misuse the word at the first place and truly understanding the real meaning behind every word so that the design will reflect the philosophy of the idea, which has different role in the ecosystem.

Although the ideas of this research might not be accepted by some people, it may serve as a modest spur to induce other professionals to come forward with their valuable contributions in food landscape by treating this topic seriously. Nevertheless, the principles and strategies or any other ideas supporting food landscape from this research once are accepted by some landscape



designers, they will find its great reference value. For example, in some projects of food landscape, many plants are not picked up in full consideration so the plants will not grow properly. However, the designed chart from this research will consider many aspects of picking up a species so when designers try to choose the plant, the chart might help. Generally speaking, this research could not be regarded as filling the gap between theory and practice of food landscape but it will definitely inspire other professionals and academicians to work on food landscape, consider food landscape as a powerful design method and intensify the body of knowledge of food landscape.

## CHAPTER FOUR

### CASE STUDY

Two cases will be studied in this part. Case study is a form of qualitative descriptive research that is used to look at an individual to obtain practical knowledge. Since food landscape has not been introduced in design for long, most of its knowledge has not turn systematical and its application strategies and principles have not been concluded by academicians yet, thus the vivid projects will provide powerful information supporting for a design of food landscape. Firstly, the information of the example will be provided such as the project location and project type, and then basic description of the project will be given. Furthermore, what are some principles have been used will be discussed and most important is the analysis part. The analysis part is the conclusion of the principles, the project's specialties and what might contribute to its success may be found out. Through case study, more knowledge that is practical will be obtained especially related to social part so it can be thought as supplement of literature review and further assist the design.

#### Case Study of the Gary Comer Youth Center Roof Garden

Located in Chicago's Grand Crossing neighborhood, the Gary Comer Youth Center offers a safe, welcoming after-school space for indoor activity (Gorgolewski, 2011). The Roof Garden of it aims to be an after-school learning space for youth and seniors in a neighborhood with little access to safe outdoor environments. Last year alone, it produced over 1,000 pounds of organic

food used by students, local restaurants and the center's café Sleek and graphic, it turns the typical working vegetable garden into a place of beauty and respite (Gorgolewski, 2011).



Figure 4.1 Perspective of the Gary Youth Center Roof Garden  
/Image credit: Hoerr Schaudt Landscape Architects

The roof garden occupies 8,160-square-foot green roof is a model for using traditionally underutilized space for food landscape and exceptional in its balance of an aesthetic vision with practical needs (Gorgolewski, 2011). The garden provides the crowning touch to an award-winning building recognized for its bold architecture.

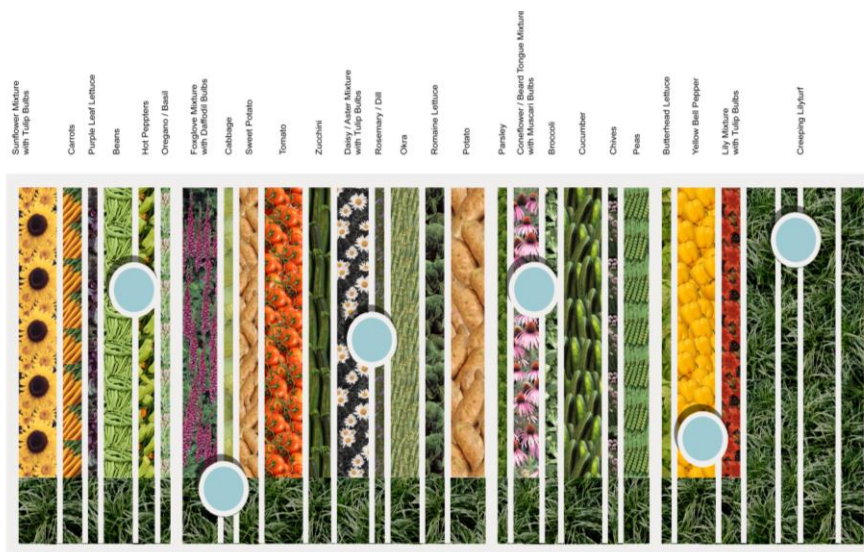


Figure 4.2 Project Plan/Image credit: Hoerr Schaudt Landscape Architects

The landscape architect worked closely with the architect and donor to develop a vision for a green roof to include a flower and working vegetable garden, and suggested that the center employ a full-time garden

manager to enhance educational program development and manage maintenance. The result is a garden used in extremely creative ways for horticultural learning, environmental awareness, and food production (Roche, 2009).

The garden itself is very simple and straightforward. It used wide range of edible plants such as cabbage, carrots lettuce and strawberries but also include common ornamental plants to enhance graphic viewing. It turns out that food landscape deals with the architecture very close in appearance, space control and temperature, which makes the project famous and shining. However, the fact which makes the project successful is that the garden's form as well as the management. The form of garden turns narrow strip, which makes convenience for children to work at them. Moreover, they hired a garden manager not only for maintenance of garden but also for educational program. This will promise the contingency and quality of the growing food landscape. Finally yet importantly, the project also considers roof's microclimate so it can run whole year including winter.

#### Case Study of Food Landscape in Oak Grove School, CA

Oak Grove School is a progressive, private, vegetarian k-12 coeducational boarding school located in Ojai, California. It was founded in 1975 and focused on inquiry-based learning and project-based learning (Law, 2001). Inspired by the original intent and statement of philosophy left by the school's founder, the mission of Oak Grove School is to assist students in developing those qualities of mind, heart, and body that will enable them to function with excellence, care and responsibility in the modern world (Law, 2001). In addition, it is the

intention of the school to offer a place where the whole community can inquire together into the perennial questions of humankind and explore an approach to life that is whole, mindful and intelligent. In this way, faculty decided to initiate permaculture school gardening projects, which will develop a greater awareness of the subtlety of nature and let students learn the values of resourcefulness, stewardship and sustainability.

The project worked with respect to permaculture's twelve principles (Mollison, 1990). The whole project contains several small gardens, a pond, a straw bale greenhouse and the seating area.

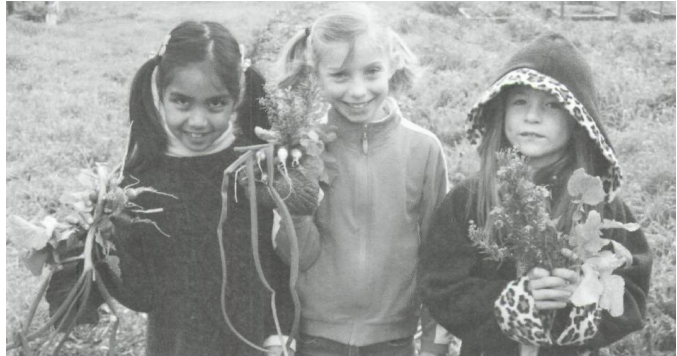


Figure 4.3 Students are enjoying their fruit  
/ Image credit: Patrick Praetorius

They developed several principles in this permaculture garden to respond permaculture philosophy. The first is 'work with nature' so that they examined natural conditions and select plants that are suited to the environment. Other principles include 'get the most gain from least effort', 'seek energy efficiency and use natural materials', 'make use of the edge effect', 'plan for beneficial relationships', 'take advantage of cyclic opportunity', etc. (Mollison, 1990). All the principles are slightly different from original permaculture principles but they fit to the project very well.

Although it is a permaculture project, it provides plenty of experience, which worth studying at for food landscape development. First, it established series of principles to keep the project work efficiently and made the theory of permaculture into practice with flexible use of



Figure 4.4 Greenhouse structure  
/ Image credit: Patrick Praetorius

existing knowledge. For example, there is a theory about nature cycle knowledge but focus overall ecosystem. In this project what have been done is just simply put food scraps and other excess plant materials go to a compost bin and let them turn into soil nutrients. The action reflected the theory at the same time it is very easy to be understood by students at school. Secondly, it creatively solve problems

by going sustainable in many ways such as plants that need intense care are planted in the most accessible locations while those with slower patterns are planted further away. Also the greenhouse was built just based on existing structure and it turned into an additional classroom which did not cost much money. This project shows that a successful project not only meet basic rules well such as selecting plants, but include creative ideas which are easy to take action and keep the spirit of nature.

## CHAPTER FIVE

### GERENAL CONDITIONS

Since food landscape is relatively a new topic and it deals with current ecosystem theory, intensive literature readings and up-to-date information turns extremely necessary so not only various source of information need to be captured in multiple ways and also a large amount of time is needed to go through these information. For obtaining newest idea of food landscape, I took part in this year's annual ASLA (American Society of Landscape Architects) in San Diego for several lectures by 'front-runners' in our profession.

The project's location is at McCormick County, SC and is about 65 miles from researcher's usual working place thus the time and expense in travel is relatively low comparing to the conference in San Diego. The survey will be delivered by email as the prior consideration so the cost is close to zero but if going to site is demanded, associated costs may only include one meal and gas fee. The survey will at all take about one and half month. The research itself has already taken four months and it is planned to finish in next two and half months except of the semester break. The initial visit already has done to get the general information about school and get the whole impression about the school and second and third visit is planned to address the detail information such as soil data. The second visit is planned on end of January next year and the third is currently scheduled on the beginning of March. At that time, research comes to the end and the design will begin based on the research result.

Given that there is no book of food landscape being published, all the information and knowledge related to food landscape is organized and arranged by the researcher herself. Hence there is a large possibility that framework of food landscape is not discussed in a systematic and

comprehensive way and there is some knowledge gap between some chapters. Because this research is mainly for a design project and the time is limited, the research itself is insufficient in theoretical content and reasoning part and turns more to practical application comparing with other research.



## CHAPTER SIX

### RESULTS

Through literature review of three bodies of knowledge to case study, the design guidelines of food landscape in Johns de la Howe School as listed are organized in three aspect: new ecological paradigm aspect, edible landscape, healing garden and general design guideline.

#### Design Guidelines drawing from new ecological paradigm body of knowledge

- 1) Different layers of vegetation need to be created to enhance the unity of ecosystem.
- 2) Spatial composition of a nature - usu. a forest could be mimicked to achieve better ecological effect, thus creating the low-maintenance landscape



Figure 6.1 Different layers of vegetation add to the unity

- 3) Use plants that are more native.
- 4) Build soil fertility with plant that fix nitrogen, amass soil minerals, act as mulch sources, or a blend of these.

- 5) Provide food and shelter for insectivorous birds and predatory and parasitic insects so the pest control work could be reduced or eliminated.
- 6) Mix species up, rather than planting in blocks of the same species. This could reduce pest and disease problems.
- 7) In Wood's Edge Pattern, take such edges to advantage by planting both in the woods and in the field to create broad areas of transition with diverse useful species.

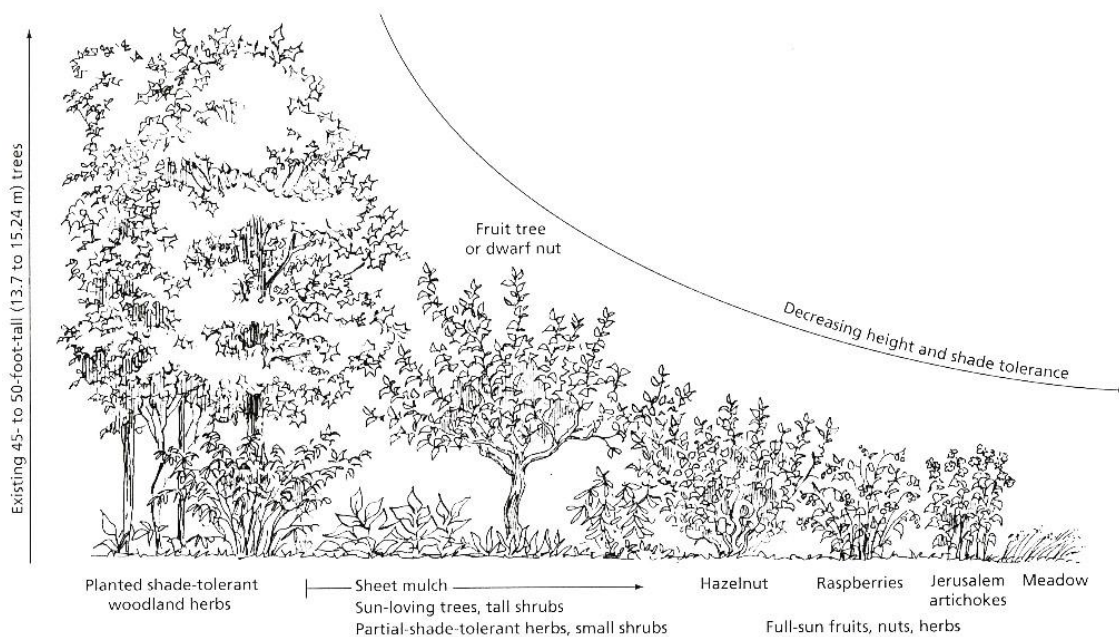


Figure 6.2 In Woods Edge Pattern, it is necessary to use transition when possible.

- 8) Use perennials to start the process of nature. They could not only renew themselves yearly without effort and also capture and recycle nutrients leaching from the soil more effectively than annuals.

### Design Guideline drawing from edible landscape

1) Initial Analysis especially soil type study is very crucial to edible landscape design.

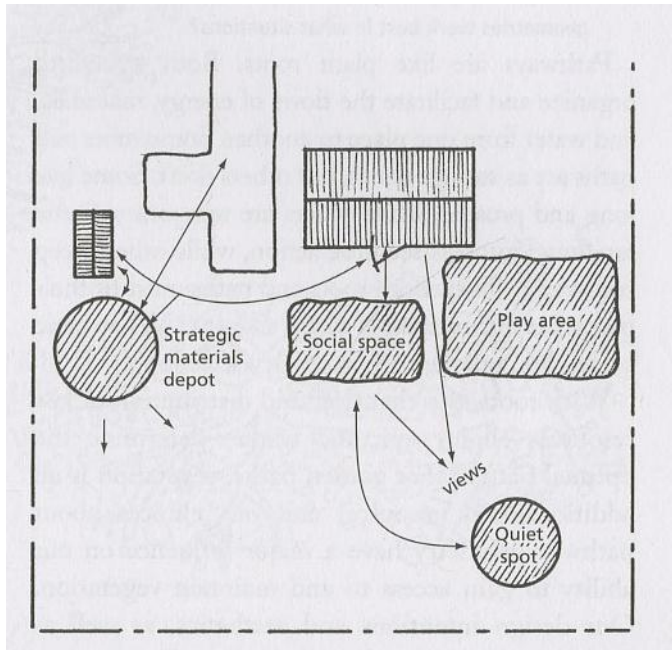


Figure 6.3 Site Analysis and Programming is necessary  
/ Image Credit: Dave Jacke

2) Plants with edible fruit need much more nutrition to grow. So provide as much nutrition and care as possible through different resources. If plants need people's care, know about the clients' available effort time.

3) Arrange variety of plants and structures into a unified, biologically dynamic whole not pieces cast asunder.

4) Use more common and familiar edible plants. Most vegetable is preferred.

5) Make beautiful landscape: take rules of harmony, scale, balance, simplicity and variety into consideration.

6) Consider the attributes of plants while choose them. Choose plants suitable to the weather zone, take less effort, fit to the soil type and catch less disease.

### Design Guideline drawing from healing garden

1) Orient the garden site to receive year-round sun and shelter from winter winds.

2) Site the garden on level terrain.

3) Conserve natural features of the site.

4) Locate the healing garden so that it is fully enclosed on all four sides and inaccessible from the public surroundings of the facility.

5) Provide shelter from the summer sun; Provide for the penetration of spring, winter, and fall sunlight; Provide shelter from precipitation.

6) Make all entrances welcoming and child-friendly.

7) Provide a clear hierarchy of pathways.

8) Provide a broad range of settings to accommodate children being together as well as children being able to withdraw from the group to be alone.

9) The scale of children needs to be considered.

10) Provide as many options as possible for children to have primary experience of nature, that is, to interact through their senses and/or through hands - on activities.

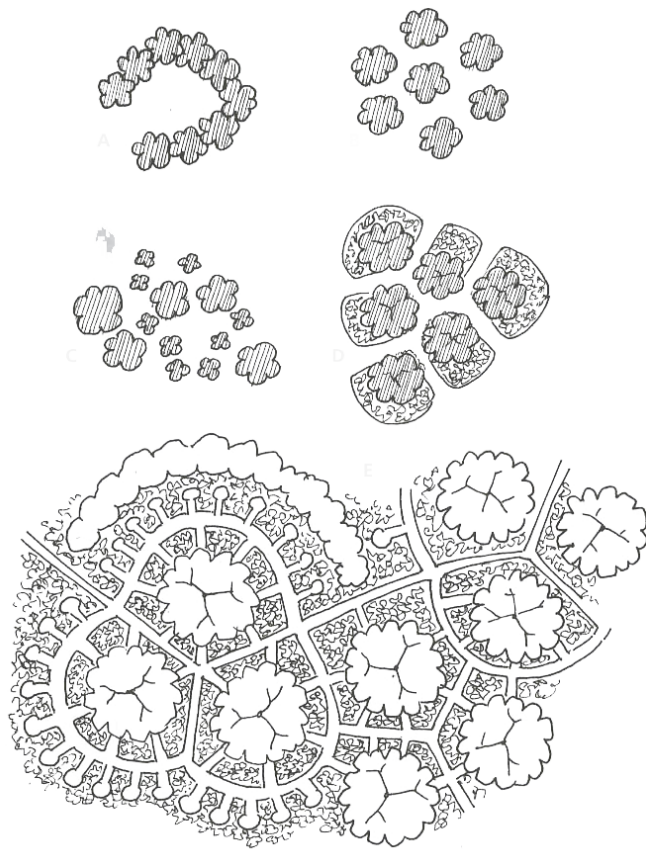
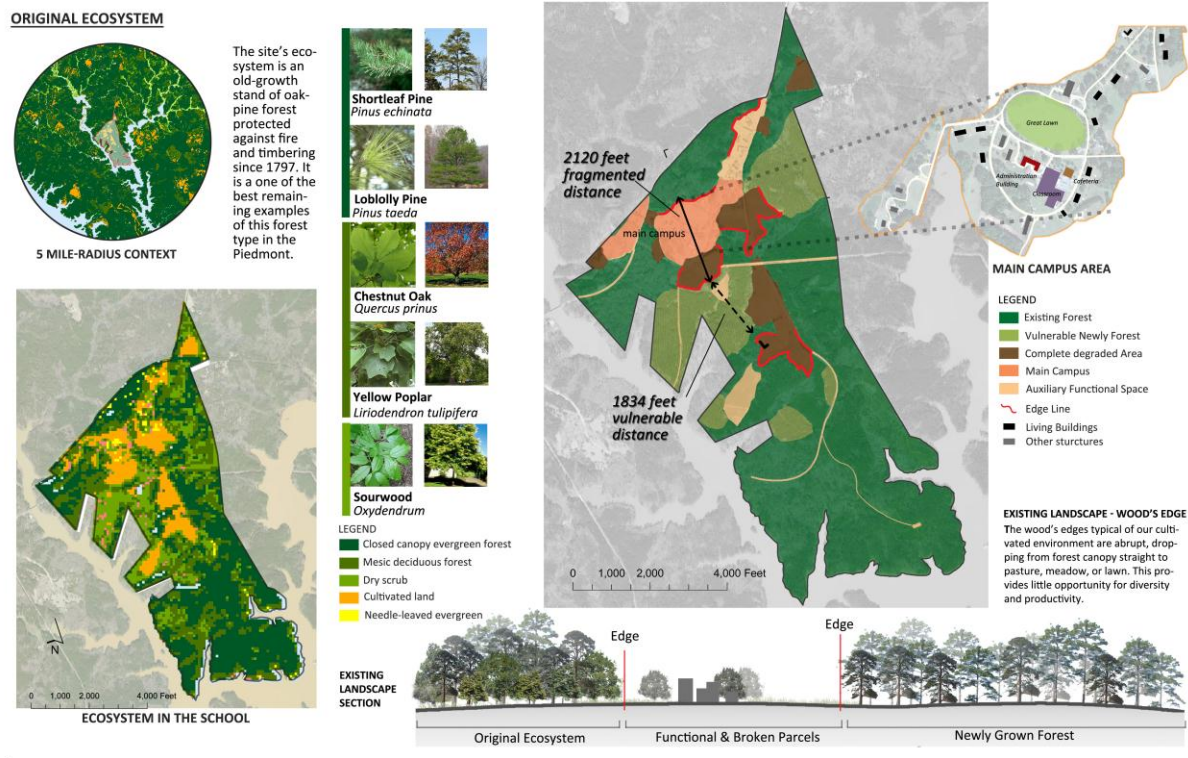


Figure 6.4 Arrange varieties of plants and structures into a unified, biologically dynamic whole not pieces cast asunder.

## Appendix A

### Site Analysis Boards



FOOD LANDSCAPE IN JOHNS DE LA HOWE SCHOOL

Figure A-1: Site Analysis Board One



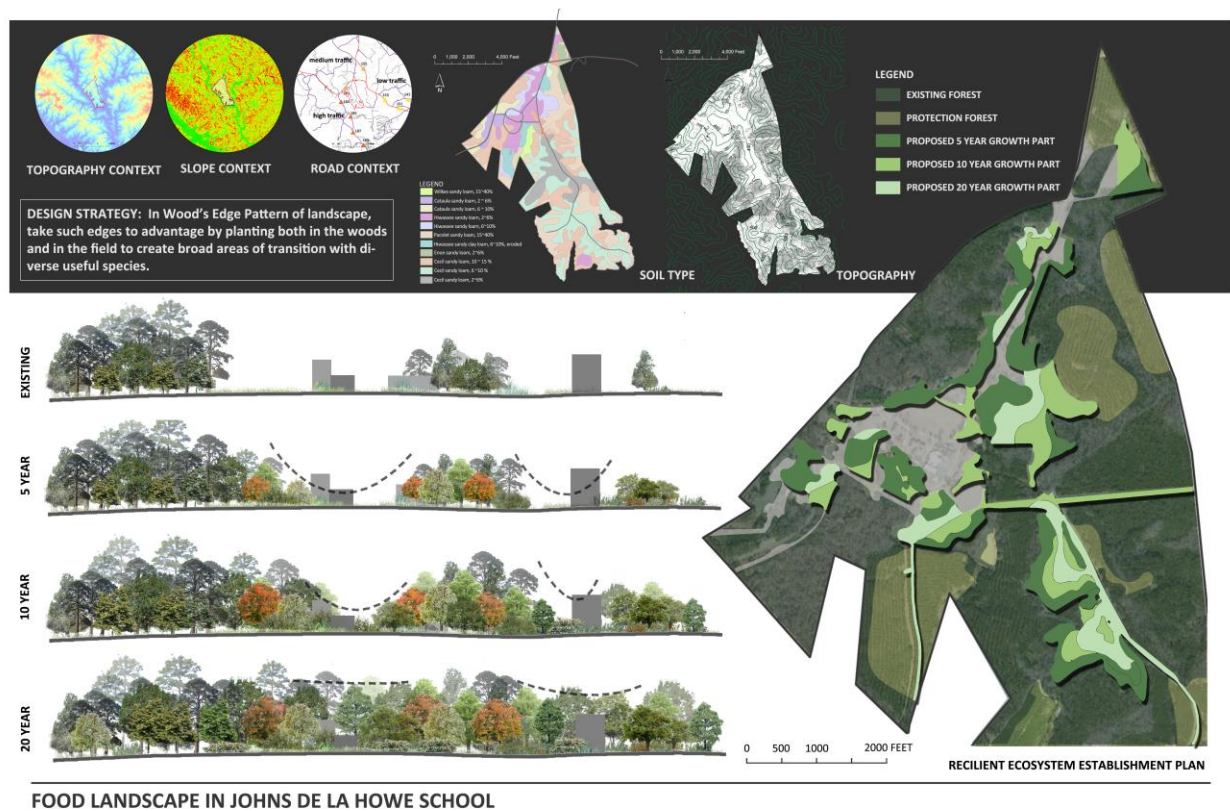


Figure A-2: Site Analysis Board Two

Appendix B

Project Design Board



Figure B-1: Master Plan

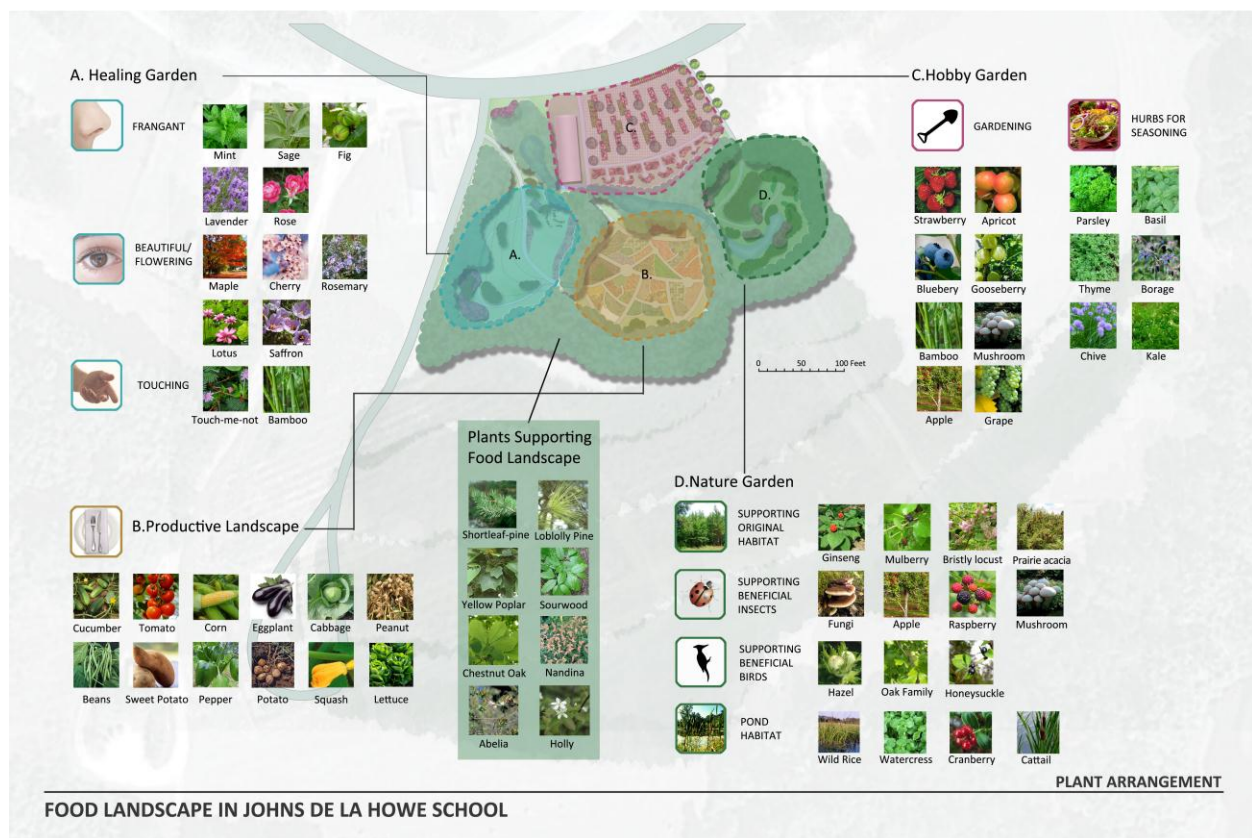


Figure B-2: Planting Design



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